

Trend Study 16A-13-02

Study site name: Steele Ranch.

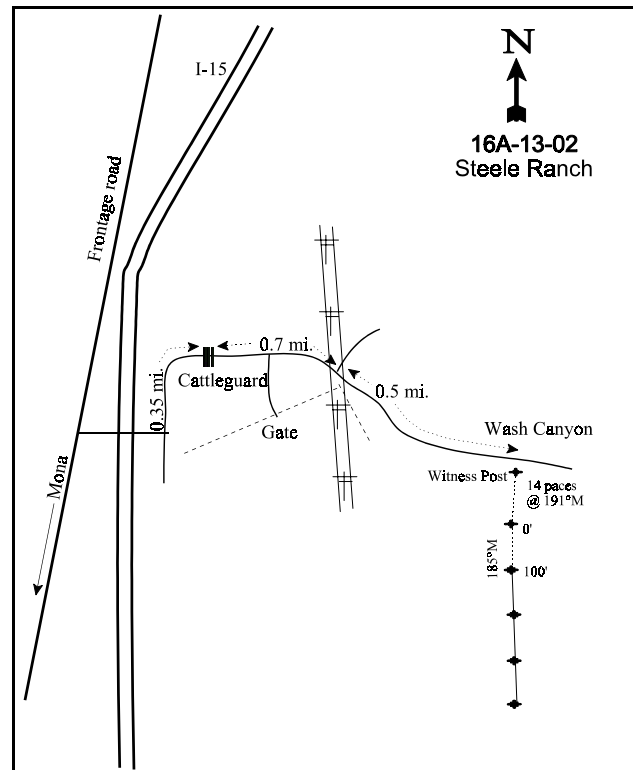
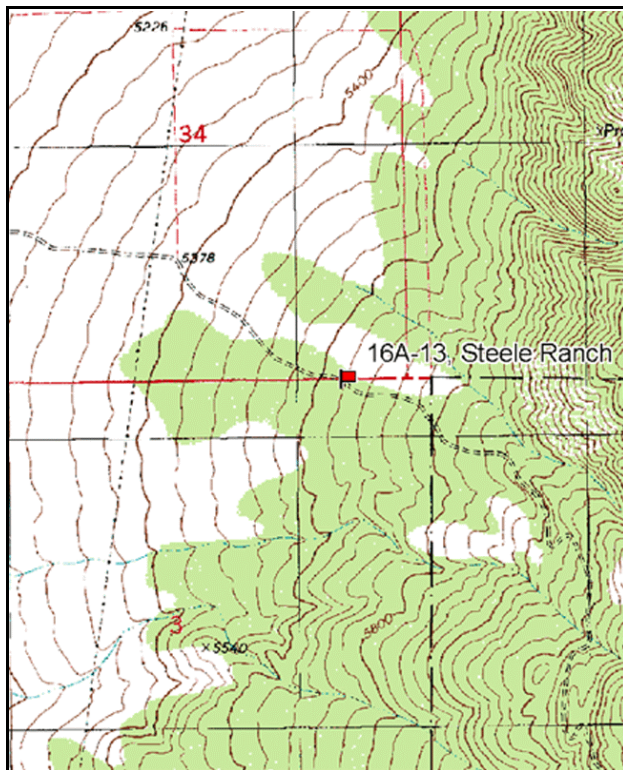
Vegetation type: Mixed Oak-Sage.

Compass bearing: frequency baseline 185 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From 200 North Main Street in Mona, take the frontage road north towards Santaquin. Go 5.35 miles and turn east onto a gravel road that goes beneath the I-15 overpass. After passing beneath I-15, the road comes to a "T", go left 0.35 miles to a cattle guard. Continue up the road 0.7 miles to a fence corner and a fork in the road. Stay to the right (south) for 0.5 miles to the witness post on the south side of the road. From the witness post the 0-foot baseline stake is 14 paces away at 187 degrees magnetic. The 0-foot stake is marked with browse tag #182.



Map Name: Santaquin

Diagrammatic Sketch

Township 11S, Range 1E, Section 3

GPS: NAD 27, UTM 12S 4416158 N 431150 E

DISCUSSION

Steele Ranch - Trend Study No. 16A-13

The Steele Ranch study is on Division property and is typical of the mixed oak-big sagebrush type along the foothills of the Wasatch Front. Much of the type has been converted to agriculture or has been heavily grazed by domestic livestock. This site is representative of what remains of the native winter range along the mountain front. The site slopes (10-15%) to the west at an elevation of 5,620 feet. Depending on the severity of the winter, the site receives moderate to heavy use by deer and light use from elk. Pellet group data from 1997 estimated little deer use, with no elk sign noted. A pellet group transect read along the study baseline in 2002 estimated 62 deer days use/acre (154 ddu/ha).

Soil at the site is relatively deep with an effective rooting depth estimated at almost 11 inches. Soil texture is a loam with a neutral pH (7.2). Rocks are common on the surface and within the profile. Phosphorus in the soil is marginal at only 9.1 ppm. Values less than 10 ppm may be limiting to normal plant growth and development. Little bare soil is exposed, making the threat of erosion minimal on the site.

Mountain big sagebrush dominates much of the area, although site observations and data from 1989 suggested an expanding oak population. Sagebrush has maintained a stable density of around 3,000 plants/acre since 1989. Use was moderate in 1989, and moderate to heavy in 1997 and 2002. Due to drought conditions, poor vigor was expressed on 35% of the shrubs sampled in 2002 and 60% were decadent. In addition, 58% of the decadent sagebrush were classified as dying. Recruitment is marginal. While in some places sagebrush decadence may be caused by competition and shading with the oakbrush, this does not appear to be the case over the entire area.

The oakbrush is very patchy in its clonal distribution, yet produces as much cover as sagebrush. The height of oak is variable with some clones growing to 10 feet, while others are less than two feet. One of the old density plots contained 99% of the oak sampled in 1989. This small sample indicated that there was a stand of very dense young sprouts. In general, the age class structure was indicative of an increasing population. Twenty-two percent of the available oak had sustained moderate hedging in 1989. With the larger sample size used in 1997, the density of oak showed a slight increase to 10,320 stems/acre. Most of the plants were classified as mature (81%), but differentiating young oak from small mature plants is difficult. It is likely that many short mature plants were classified as young in 1989. The extended baseline samples a rocky area which supports some low growing mature oak. Young plants were common making up 16% of the population. Oakbrush increased to 15,940 stems/acre in 2002. Use was light on most plants but heavy on some of the low growing mature plants. Vigor was reduced on 25% of the plants sampled due to frost damage from the spring of 2002.

The herbaceous understory is functionally limited to Sandberg bluegrass which provided 88% of the grass cover in 1997 and 77% in 2002. It has a fairly high density, but produces little forage compared to other native bunchgrasses. Forbs are diverse but not abundant. Twenty-three species of annual and perennial forbs were sampled in 1997, and combined to produce only about 3% cover. The herbaceous species only contributed 17% of the total vegetative cover in 1997, increasing to 27% in 2002.

1989 APPARENT TREND ASSESSMENT

The soil appears stable. Little change would be expected to occur with the pavement dominated surface. There are two notable indicators of a downward trend presently apparent on the site: the expanding, highly competitive oakbrush and the high level of decadence in the mountain big sagebrush population. Vigor is good and utilization is sustainable on this key browse species. The herbaceous understory is depleted and basically nonproductive.

1997 TREND ASSESSMENT

The soil trend is currently stable. Ground cover characteristics have remained similar to the 1989 observations. The browse trend for sagebrush is stable. Some of the change in density may be due to the larger sample which gives more accurate estimates of shrub densities. However, it is apparent that some of the decadent plants sampled in 1989 have died. Currently, percent decadence has declined from 55% to only 19%. Use is moderate to heavy, but vigor is normal on most plants. Oak has a similar population density compared to 1989. The proportion of young plants has changed drastically, although some of the change may be due to classification errors and the larger sample size. The population appears to be increasing with the combination of good recruitment, low decadence, and good vigor. Overall browse trend is considered stable. The herbaceous understory is insufficient. Sum of nested frequency for grasses has remained similar to 1989, while sum of nested frequency for forbs has increased slightly. Trend overall is considered stable.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable, but insufficient (3)

2002 TREND ASSESSMENT

Trend for soil remains stable. There is abundant protective ground cover leaving little exposed bare ground. Trend for the key browse species, mountain big sagebrush, is considered down slightly. Density has increased since 1997, but due to drought conditions for the past few years, the number of decadent plants has increased from 19% of the population to 60%. In addition, 58% of the decadent plants sampled were classified as dying (>50% crown death). Recruitment is marginal and not sufficient to maintain the current population, especially if drought conditions persist. Gambel oak continues to slowly increase in density. It is mostly lightly browsed, generally in good vigor, with low decadence. Trend for the herbaceous understory is stable but still depleted. Sum of nested frequency of perennial grasses has remained stable while frequency of perennial forbs has increased. However, total herbaceous cover is only 10%. The only abundant perennial species is Sandberg bluegrass which accounts for almost one-half of the total herbaceous cover. It has remained stable in nested frequency.

TREND ASSESSMENT

soil - stable (3)

browse - down slightly (2)

herbaceous understory - stable but depleted (3)

HERBACEOUS TRENDS --

Herd unit 16A, Study no: 13

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron spicatum	-	-	8	-	-	3	-	.09
G	Bromus tectorum (a)	-	_a 100	_b 131	-	34	51	.29	.65
G	Festuca myuros (a)	-	_b 30	_a -	-	12	-	.06	-
G	Poa fendleriana	_a 1	_{ab} 16	_b 26	1	5	11	.08	.61
G	Poa secunda	235	233	218	83	80	77	3.29	4.68
G	Sitanion hystrix	-	-	2	-	-	1	-	.03
Total for Annual Grasses		0	130	131	0	46	51	0.35	0.64
Total for Perennial Grasses		236	249	254	84	85	92	3.37	5.42
Total for Grasses		236	379	385	84	131	143	3.73	6.07

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
F	Agoseris glauca	-	8	5	-	4	3	.02	.04
F	Alyssum alyssoides (a)	-	_b 234	_a 163	-	68	52	.51	.83
F	Allium spp.	-	2	-	-	1	-	.00	-
F	Antennaria rosea	-	-	1	-	-	1	-	.00
F	Arabis spp.	5	1	2	2	1	1	.00	.00
F	Astragalus beckwithii	_a 3	_b 11	_a -	1	6	-	.08	-
F	Astragalus eurekaensis	_a -	_a -	_b 30	-	-	13	-	.18
F	Astragalus utahensis	-	2	-	-	2	-	.03	-
F	Castilleja linariaefolia	-	6	6	-	3	2	.04	.06
F	Calochortus nuttallii	_a 21	_a 34	_b 77	12	16	37	.08	.23
F	Castilleja spp.	6	3	-	4	2	-	.01	-
F	Comandra pallida	-	-	4	-	-	2	-	.03
F	Collinsia parviflora (a)	-	_a 6	_b 21	-	3	9	.01	.04
F	Crepis acuminata	-	-	5	-	-	3	-	.07
F	Cryptantha spp.	-	3	-	-	1	-	.00	-
F	Draba spp. (a)	-	-	1	-	-	1	-	.00
F	Epilobium brachycarpum (a)	-	12	6	-	6	4	.03	.02
F	Erigeron pumilus	-	-	-	-	-	-	-	.00
F	Eriogonum racemosum	3	2	-	1	1	-	.00	-
F	Galium aparine (a)	-	_b 77	_a 58	-	26	22	.96	.23
F	Holosteum umbellatum (a)	-	51	32	-	17	12	.13	.06
F	Lactuca serriola	-	-	3	-	-	1	-	.00
F	Lomatium spp.	_a 5	_b 33	_b 23	4	14	13	.48	.36
F	Microsteris gracilis (a)	-	-	6	-	-	3	-	.01
F	Petradoria pumila	3	-	1	1	-	1	-	.00
F	Phlox longifolia	20	35	24	8	16	12	.10	.11
F	Ranunculus testiculatus (a)	-	_a 116	_b 147	-	37	45	.47	1.95
F	Tragopogon dubius	3	4	1	1	2	1	.01	.01
F	Unknown forb-annual (a)	-	6	-	-	3	-	.01	-
F	Veronica biloba (a)	-	2	6	-	1	2	.00	.01
F	Viola spp.	-	3	5	-	2	3	.01	.01
F	Zigadenus paniculatus	-	-	1	-	-	1	.01	.01
Total for Annual Forbs		0	504	440	0	161	150	2.15	3.18
Total for Perennial Forbs		69	147	188	34	71	94	0.91	1.17
Total for Forbs		69	651	628	34	232	244	3.07	4.35

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Herd unit 16A, Study no: 13

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Artemisia tridentata vaseyana	75	75	13.34	13.93
B	Gutierrezia sarothrae	2	5	.06	.19
B	Quercus gambelii	55	58	18.79	13.64
Total for Browse		132	138	32.20	27.76

CANOPY COVER --

Herd unit 16A, Study no: 13

Species	Percent Cover	
	'97	'02
Quercus gambelii	14	17

Key Browse Annual Leader Growth

Herd unit 16A , Study no: 13

Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	1.8

BASIC COVER --

Herd unit 16A, Study no: 13

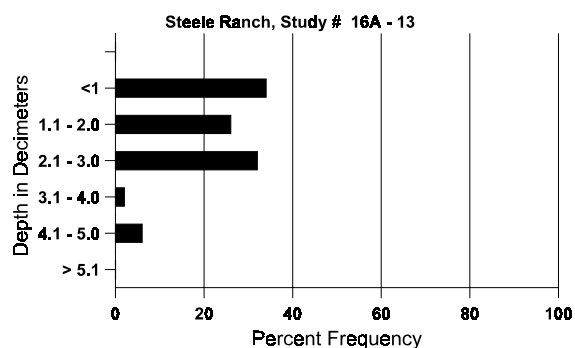
Cover Type	Nested Frequency		Average Cover %		
	'97	'02	'89	'97	'02
Vegetation	367	338	3.00	38.51	36.13
Rock	166	152	3.75	5.61	5.34
Pavement	172	167	26.75	9.78	8.90
Litter	397	388	56.75	58.58	60.54
Cryptogams	161	122	5.75	3.87	4.72
Bare Ground	150	153	4.00	4.83	6.14

SOIL ANALYSIS DATA --

Herd Unit 16A, Study no: 13, Steele Ranch

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
10.6	47.6 (13.1)	7.2	37.1	41.1	21.8	4.0	9.1	86.4	.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 16A, Study no: 13

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre 02	Days Use per Acre (ha) 02
Rabbit	5	3	-	-
Deer	7	15	809	62 (154)

BROWSE CHARACTERISTICS --

Herd unit 16A, Study no: 13

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total								
		1	2	3	4				1	2	3	4				
Artemisia tridentata vaseyana																
S	89	1	-	-	-	-	-	-	-	1	-	-	-	66		1
	97	4	-	-	-	-	-	-	-	4	-	-	-	80		4
	02	2	-	-	-	-	-	-	-	2	-	-	-	40		2
Y	89	4	1	-	-	-	-	-	-	5	-	-	-	333		5
	97	1	-	-	-	-	-	-	-	1	-	-	-	20		1
	02	6	3	-	3	-	-	-	-	12	-	-	-	240		12
M	89	8	7	-	1	-	-	-	-	16	-	-	-	1066	22 23	16
	97	34	43	19	2	2	-	-	-	100	-	-	-	2000	26 40	100
	02	17	24	11	2	-	-	-	-	54	-	-	-	1080	25 36	54
D	89	8	18	-	-	-	-	-	-	22	-	4	-	1733		26
	97	5	10	8	-	-	-	-	-	14	-	-	9	460		23
	02	29	14	44	-	7	3	4	-	39	-	-	59	2020		101
X	89	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	97	-	-	-	-	-	-	-	-	-	-	-	-	460		23
	02	-	-	-	-	-	-	-	-	-	-	-	-	820		41
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>					
'89		55%			00%			09%			-21%					
'97		44%			22%			07%			+26%					
'02		29%			35%			35%								
Total Plants/Acre (excluding Dead & Seedlings)											'89	3132	Dec:	55%		
											'97	2480		19%		
											'02	3340		60%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	2	1
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	6	9	4
	02	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	5	5
D	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	1	-	-	20			1
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%			-85%							
'97		00%			00%			00%			+33%							
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	532	Dec:	12%			
												'97	80		0%			
												'02	120		17%			
Quercus gambelii																		
S	89	6	-	-	-	-	-	5	-	-	11	-	-	-	733			11
	97	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
	02	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	89	85	18	1	4	-	-	-	-	-	108	-	-	-	7200			108
	97	85	-	-	-	-	-	-	-	-	85	-	-	-	1700			85
	02	12	-	10	16	-	-	13	-	-	43	-	8	-	1020			51
M	89	10	9	-	-	-	-	-	-	-	19	-	-	-	1266	33	24	19
	97	419	-	-	-	-	-	-	-	-	419	-	-	-	8380	54	40	419
	02	591	31	28	23	-	48	25	-	-	553	-	168	25	14920	44	27	746
D	89	12	4	-	-	-	-	-	-	-	15	-	1	-	1066			16
	97	12	-	-	-	-	-	-	-	-	11	-	-	1	240			12
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	920			46
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	320			16
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		22%			.69%			.69%			+ 8%							
'97		00%			00%			.19%			+35%							
'02		04%			11%			25%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	9532	Dec:	11%			
												'97	10320		2%			
												'02	15940		0%			